THE DENTAL Digest

MARCH 1943

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THE DENTAL Digest

VOL. 49 NO. 3

MARCH 1943

EDWARD J. RYAN, B.S., D.D.S., *Editor*
ETHEL H. DAVIS, A.B., *Assistant Editor*
708 *Church Street, Evanston, Illinois*

E. Byron Kelly, D.D.S. (University of Illinois College of Dentistry, 1902; LL.B., Chicago Law School, 1913) is a licensed specialist in prosthodontia who in conjunction with his practice has been engaged in private research for many years on new denture materials, and in recent years, on the plastics in particular. In this field of plastics in denture construction Doctor Kelly is recognized as one of the pioneers. His last publication with us was in July, 1940, when he described his Surgical Denture Splints: A New Method in Immediate Denture Service. His present article, which was read before the American Academy for Plastic Research in Dentistry in Chicago last month, describes the principles of his latest developments in denture technique: rapid polymerization, staggered heat control and laminated processing. Next month the step-by-step details of the technique will be presented.

About Our CONTRIBUTORS

Newman D. Winkler, D.D.S. (Columbia University, 1924) was an externe at Gouverneur Hospital from 1923 to 1925, assistant visiting dentist at Fordham Hospital since 1932. Doctor Winkler is a general practitioner who in April of last year wrote for us an article on posterior acrylic inlays and crowns. He now describes his method of reinforcement of acrylic inlays and crowns.

Solomon S. Seidenberg is a student in his junior year at the New York University College of Dentistry.

Gregory B. Salisbury, D.D.S. (Temple University School of Dentistry, 1934) in January of this year presented his preliminary report in this magazine on the Application of Methyl Methacrylate to the Mouth: Cured at Mouth Temperature. This was followed in February by his description of Polymerization of Individual Direct Acrylic Restorations which was illustrated by photomicrographs showing polymerization at room and at mouth temperatures. This article gave rise to many questions by readers which were so specific and pertinent that the answers to them seemed to call for a third article in which these questions and answers might be made available to all who were interested. Direct Acrylic Restorations in this issue fulfills this purpose.

William J. Kelly, D.D.S. (Temple University School of Dentistry, 1934) and Henry W. Langheinz, Ph.G. (Columbia, 1923) and D.D.S. (University of Illinois, 1929) both practice general dentistry and are co-authors in this issue of Physiologic Determination of the Vertical Dimension.

Rapid Polymerization in Denture Construction*

E. BYRON KELLY, D.D.S., Chicago

DIGEST

Principles involved in rapid polymerization, using a staggered heat control and a laminated processing method, are herewith outlined preparatory to the detailed technique to be described next month:

1. The application of heat on acrylic material will cause expansion followed by contraction on cooling.

2. If the flask is left slightly open to permit the primary expansion, and polymerization sets in, any pressure applied thereafter to force the material into closer contact with the walls of the mold, will, when cold, show definite internal strains. These strains will ultimately cause physical changes in the denture if the case is placed in hot or boiling water, the tendency being for the base material to assume the form presented, before the cooling fixes the compressed material.

3. Contraction of all acrylic denture material is away from the cast and toward the greatest bulk. In addition there is physical tension established by the teeth in the mold. The heating unit (hot water) will first reach the acrylic mix between the halves of the flask at the periphery, and polymerization at these points develops long before the internal mass begins to stiffen or solidify. In molding articles when a straight polymer is used, great difficulty is experienced because the heat does not reach the internal mass until a crust or shell is formed at the walls of the mold.

4. Any method of liberating gas or relieving strains before polymerization reaches a solidified stage improves the finished product.

5. It is possible to construct an acrylic denture with sufficient dimensional tolerance to withstand reasonable temperature changes without involving noticeable warpage or definite change in form.

6. a) Processing is done in two sections: first by making a primary cure to form the major part of the denture involving the teeth and gums; and second, a lamination or relining of the case by the addition of fresh material.

b) This double processing requires only one flasking, and is made possible by using a separating medium which covers the cast side of the flask during the first polymerization.

c) Before the first section of the material becomes thoroughly cured the flask is opened while hot, and the separating medium removed. This primary packing is then subjected to treatment intended to relieve the internal forces and also to allow for maximum amount of contraction.

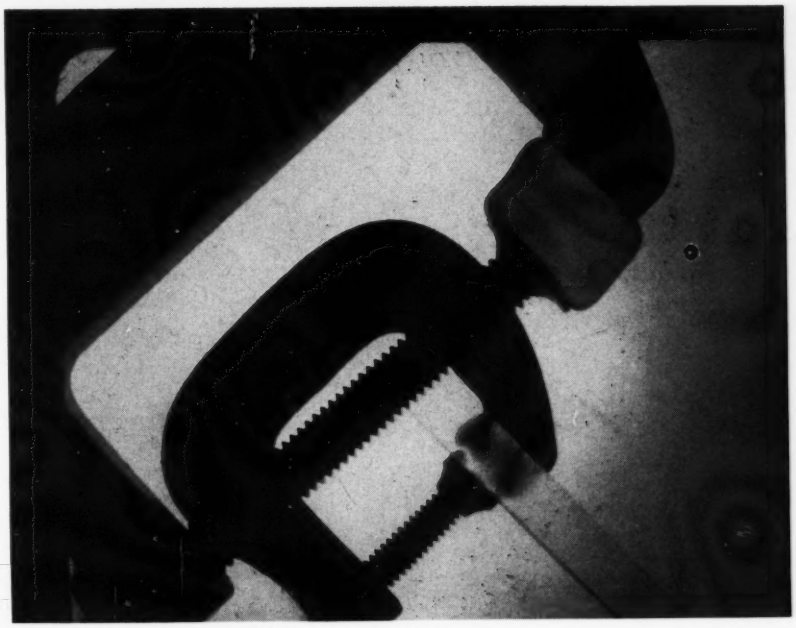
d) After this physical adjustment of the material is made within the major section of the denture, a second mix is applied to form the inner lining for the case.

e) It is presumed that any forces present in the second application are not strong enough to overcome the base which has been relieved of the major strains.

THE INTRODUCTION of acrylic resin in 1937-1938 for restorative dentistry resulted in a great deal of research and experimentation to determine the best methods of utilizing this product. The material has been accepted as ideal from the standpoint of color, stability, toughness, lightness of weight, resistance to acids, and freedom from any fungus growth. Acrylic resin, however, possesses many physical properties that have brought disappointment and considerable complaints. To add to some

*Read before the American Academy for Plastic Research in Dentistry, Chicago, February 21, 1943.

of the natural physical drawbacks, the material has been subjected to improper handling by dentists and technicians. Under these conditions hundreds of thousands of dentures have been made which should have had no place in a scientific profession. From an engineering point of view, these dentures are absolute failures. The construction of these poorly-fitting appliances today are to a certain extent due to the technical instructions originally formulated by our research leaders. As dentists we have permitted the beauty of the highly polished denture to assist us in giving the patient a psychologic treatment in the hope that we may overcome the knowledge that the denture does not accurately fit the mouth.



Observations under Polarized Light:
Fig. 1—Effect of slight pressure on plastic material. Note strains in that part of the plastic material under force.

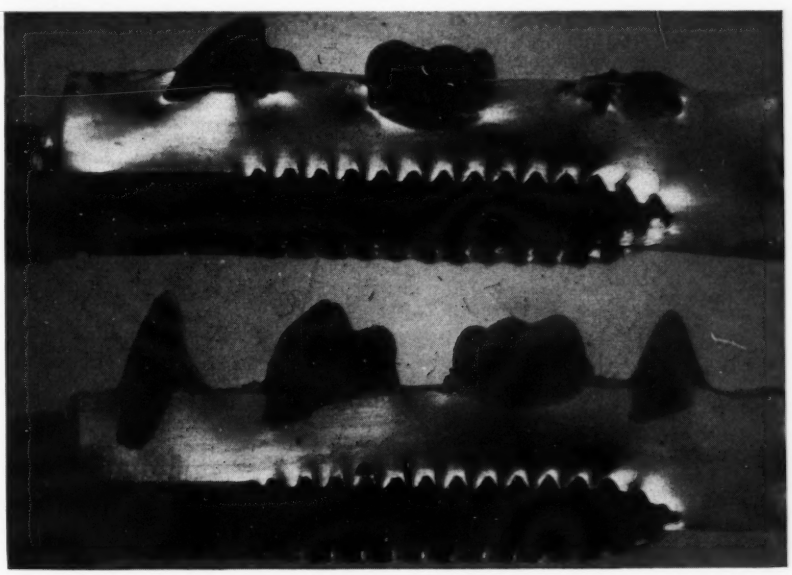


Fig. 2—Upper: Porcelain. Lower: All-plastic teeth. The screw processed in the plastic material results in severe strains around this metal element. Strains are evident around the porcelain teeth and pins. There is no strain around the plastic teeth. Porcelain teeth which are foreign bodies within the plastic result in decisive strains, particularly at the pins and diatoric retention parts. Cracking always begins at the sharp points in the metal. The larger the metal appliance, the greater the tension that is established.

Processing Principles

Physical changes in material and defects noted in the finished denture seem to have centered around the method of processing. Previous investigation and research have resulted in the acceptance of two minor principles in processing acrylic dentures: low heat and prolonged treatment.

Until the latter part of 1941 I was of the impression that these two basic rules were correct, but research during the last year has convinced me that polymerization in an acceptable state can be done in a short period of time and that prolonged treatment is not essential.

The first principle of low heat still appears sound but in the technique to follow next month, a staggered method for heat control is presented, which holds the material in suspension during the polymerization stage.

Physical Properties of Acrylic Material

Before discussing methods of processing, let us consider some of the physical properties of acrylic material. What actually takes place while processing a denture? What changes take place later?

Adaptation to Cast—The first essential in the making of satisfactory dentures consists in a close adaptation to a cast which has been obtained from an accurate impression of the mouth. It should be understood that the denture when cooled after processing must not only be in close contact with the cast at that time but must be as free as possible from physical forces within the base material in order that the original relationship be maintained at all times.

Control when processing plastic materials in industry has been one of the most difficult problems for the manufacturers. From the standpoint of the dental laboratories, however, it is possible to overcome to a certain extent some of the common physical imperfections found in denture construction.

It should be understood that in processing an acrylic denture, using a liquid and a powder (which involves a loss in volume of 11 per cent), internal stresses

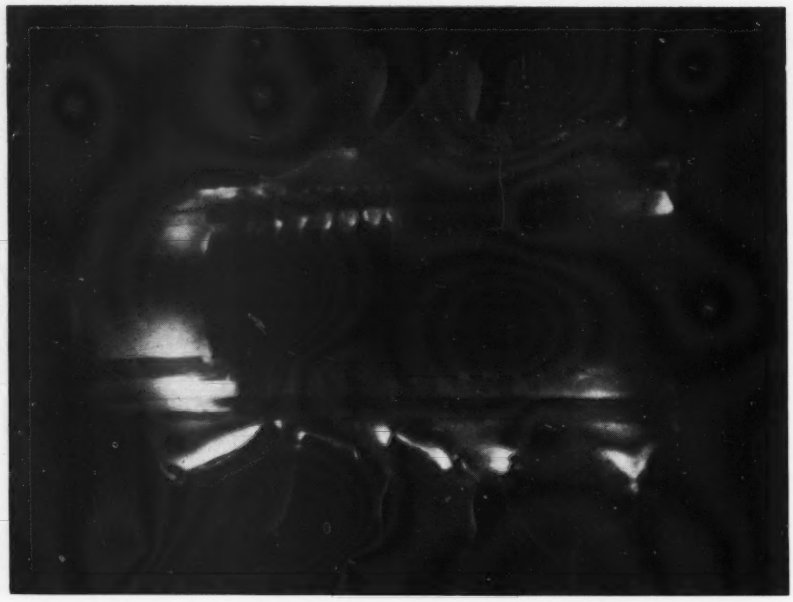


Fig. 3—Another illustration of the difference between all-plastic and porcelain and the surrounding strains. The strains on the porcelain tooth are so great that checks and cracks can be seen. Wherever there is the slightest sharp point there will be a weakness in the material. Never use a flat or a square piece of metal with sharp spurs for attachment with plastic material. The metal must be rounded to eliminate strains. Avoid all sharpness. Also, all supports should be made with a double bar instead of a single.

and strains will be created within the appliance. These forces possess the characteristic of being either active or passive.

Internal Forces—Without going into a long technical discussion of exactly what occurs during the processing of acrylic dentures, let us assume that the molded material possesses the physical characteristics both of rubber and of a steel spring. As long as no tension or force is placed upon a prepared mix, only the factors of contraction and volatilization of the liquid are to be considered. But on the application of heat to bring on polymerization (stiffening plus the power exerted for compression), internal forces are created which

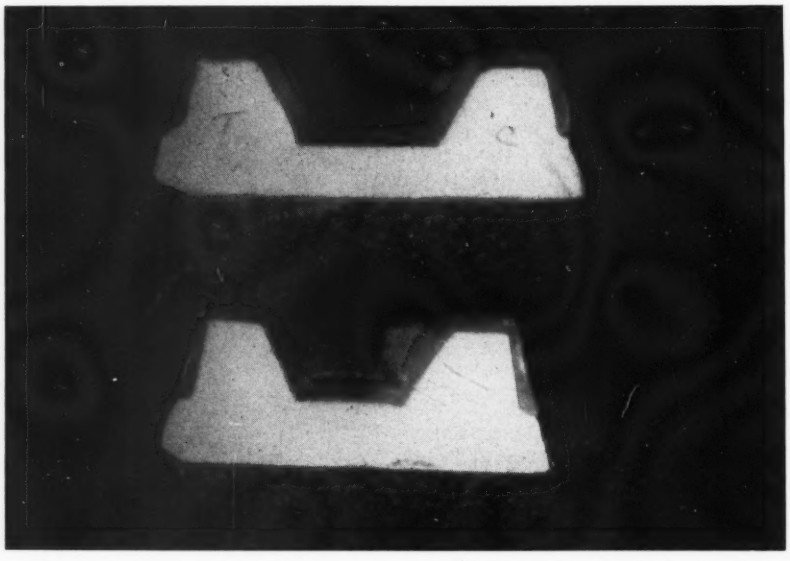


Fig. 4—Illustrating the difference between processing against tin foil and the use of cellophane. The use of tin foil, which undergoes less expansion and contraction than cellophane under heat treatment, will insure closer adaptation to the cast.

are held intact to a certain extent by the cooling of the material.

Active: Active forces are those which break loose when subjected to slight changes in temperature or become liberated by some solvent. A porcelain tooth may crack or the denture give way for apparently no reason, but usually the cause arises from these uncontrolled forces.

Although I have been unable to find any authority who has attempted to classify stress and strain, which are always present when pressure is exerted upon the heat-molded material, all authorities do agree that these forces possess different characteristics according to the molecular setup.

Latent: In the reference to latent forces, or passive forces, I speak of those forces that lie dormant under ordinary conditions of service; in other words, not easily influenced by moisture or dryness, or slight changes in heat or cold. In creating stress and strain in acrylic material, two vital factors must be considered: first, over-compression, and second, expansion and contraction within the closed mold as a result of heat and particularly of exothermic rise in temperature.

In the present method of mixing, packing, and flasking of acrylic materials for dentures, the flask is closed in such a manner as to eliminate insofar as possible any air pockets within the mix and to compress the material for condensation without damaging the cast or teeth which form a part of the mold itself.

When the acrylic polymer and monomer are prepared and packed in the flask and subjected to the hot water heat, the material soon becomes a soft jelly-like, flowing mass. As the heat increases, the mixture will retain this soft consistency for only a limited time, until the reaction of polymerization sets in and pressure resistance develops. Although the material, with its thermoplastic properties, never becomes actually hard in the hot water bath, it should be recognized that the moment polymerization sets in, internal forces are being formed which have a great deal to do with the quality and physical properties of the finished product.

Over-Compression: The factor that

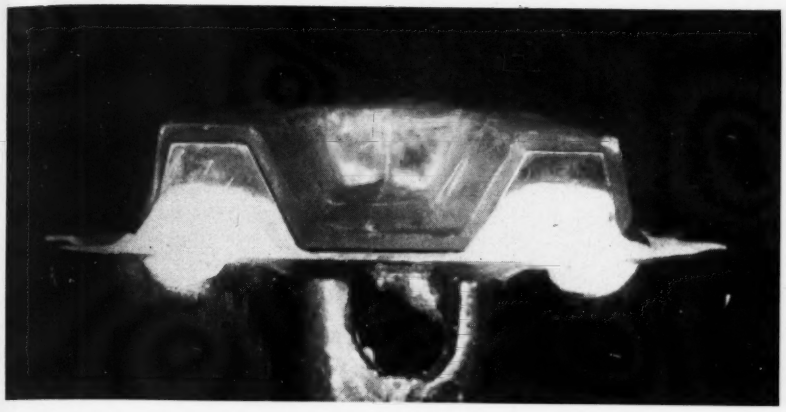


Fig. 5—One and one-half hour processing technique. Standard method. Acrylic adapted over the master metal cast. The fit is accurate. The flask was closed at 190° F. and carried to boiling where it was held for 30 minutes and then bench-cooled.

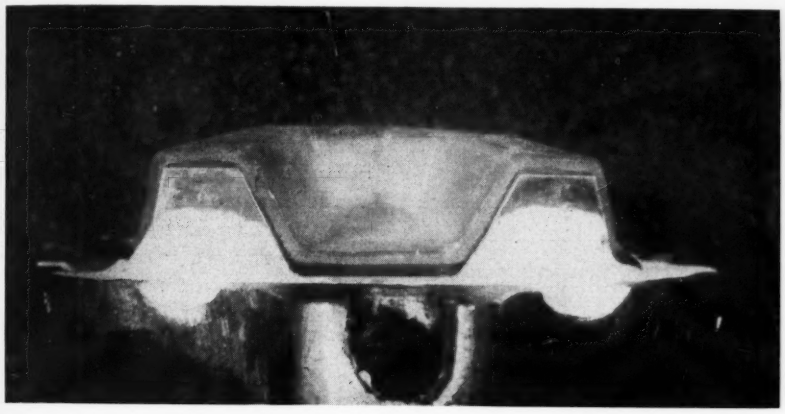


Fig. 6—Same case after two weeks' immersion in lukewarm water. Note the dimensional change.

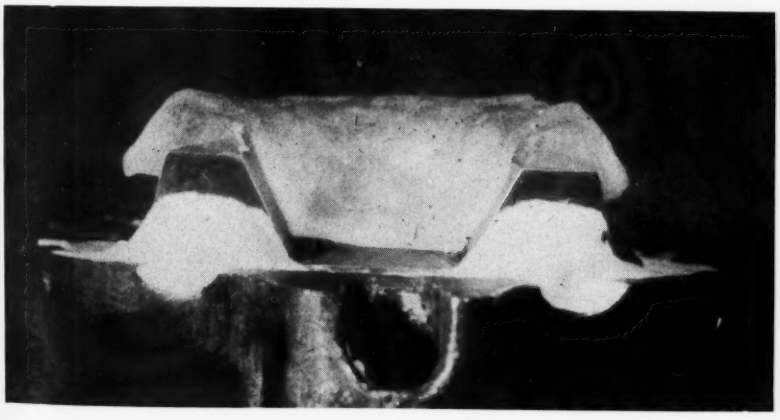


Fig. 7—Note distortion that follows dipping of case into boiling water for 5 minutes.

must be considered is over-compression of material while the mix is undergoing heat treatment and polymerization. As polymerization increases and flask tension is applied, internal forces develop accordingly. These stresses and strains formed within the base material become fixed when the flask is cold.

With this basic principle, it is easy to understand that any force exerted on a partly or fully polymerized denture for closer relationship to the mold will result in stresses and strains within the denture. This physical tension within the appliance will under certain conditions cause the material to assume its original shape. This may be referred to as "plastic memory," and may be demonstrated by boiling a cylindrical piece of acrylic resin to remove all major forces, then compressing the specimen with a clamp in boiling water to half the diameter, and then cooling. The specimen will retain this distorted shape with the internal forces ready for release. If again placed in boiling water, these stresses and strains are removed and the plastic returns to within a fraction of its original dimension.

It should be borne in mind, then, that any pressure made on a flasked case after polymerization has set in, to force closer adaptation to the cast, will result in a finished product that is weak in physical security. A denture constructed in this manner will later become warped or distorted even when placed in lukewarm water.

Expansion and Contraction within Closed Mold: In considering the second factor as a cause of strains, we should carefully study the graph of the time temperature chart submitted to the American Academy for Plastic Research in Dentistry in 1941 by W. F. Bartoe of Rohm and Haas, Philadelphia. This original report on the internal behavior of acrylic mixes on the application of heat (later confirmed by many investigators) is of particular interest. It should be noted that the heated resin confined in a closed flask will in a short time reach a temperature far greater than the water bath into which it is suspended.

During the last year I have conducted considerable research in order to determine exactly what effect this sudden and high dynamic rise in temperature has on the resinous mass. Considerable data have been accumulated, but a full report is not available at this time. It may be said now, however, that a control of heat in the mass so as to prevent this "explosion," or the rapid internal rise in temperature, will result in a product possessing far more satisfactory qualities than can be had by a denture

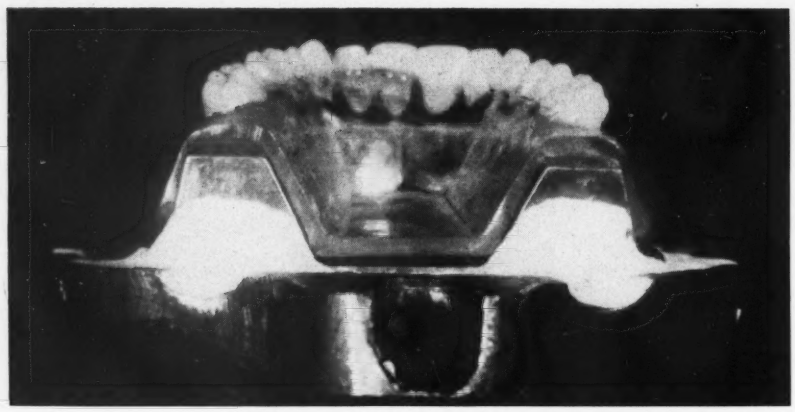


Fig. 8—Changes that follow ordinary methods of processing acrylic dentures after a period of a few weeks in water at body temperature.

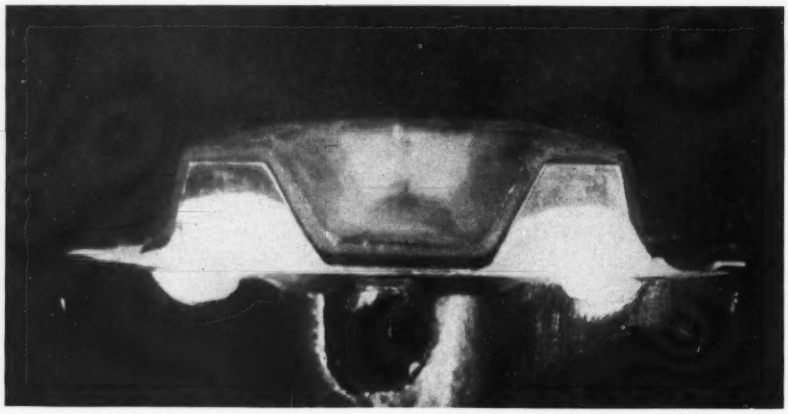


Fig. 9—Acrylic base. Flask was closed before the application of any heat.

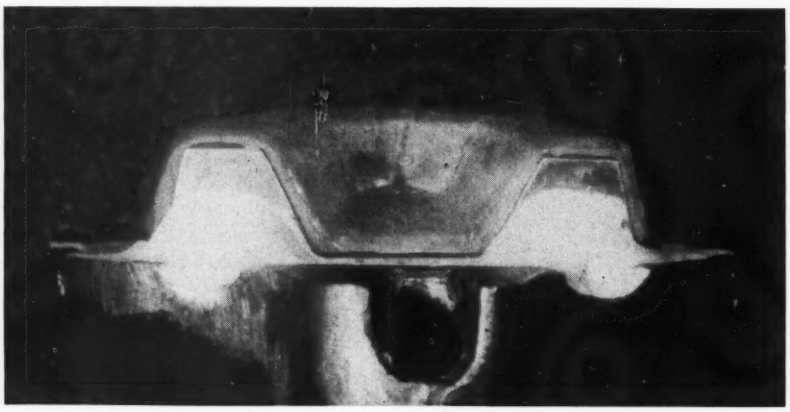


Fig. 10—Acrylic base. Flask was gradually closed, and completely closed at 175°.

that is literally cooked by crystallizing heat.

The high-heat polymerized specimen when tested is found to be more brittle than observed in the low temperature treated specimen. Gas bubbles and void areas are also to be noted, which condition is probably the result of trapped air or the gas created by the monomer.

Factors Underlying Rapid Polymerization

In recommending this radical departure from the slow, low temperature processing method which has appeared in many published articles, including my own, I do so with a feeling of security because of the confirmation of its value made by many of my associates who have agreed with my observations. Insofar as rapid polymerization is concerned the chief factor to be considered is the quality of the finished product. If the cycle of heat cure can be reduced from 2, 3, or 4 hours, or longer, to a water bath treatment of 40 minutes, as advocated here, with better results, then the conclusion is obvious.

Heat Treatment of a Prepared Mix of Acrylic Material—We all know that a hard specimen can be obtained in a few minutes with heat and pressure; but we also know that void areas, bubbles, and porosity usually accompany the experiment; however, the defects are present in the material within a closed mold, because there has been no provision made to liberate the gases and air before polymerization fixes them within the material.

It is clear that any quick volatilization of free monomer in the mold must have an opportunity to escape or defects will follow. In denture processing, polymerization occurs first at the rims of the flask and nearest the walls of the mold; thus the avenue for liberation of gases becomes shut off before the internal mass reaches a physical adjustment.

What is sought is a denture base material that will undergo the minimum amount of changes from the moment the heat subsides in the flask and throughout the years of service. Manufacturers of plastic articles waste no time in heating, pressing, and molding: They may subject the material to a quick high-temperature treatment when a variation of 5, 10 or 15 degrees in temperature would mean disaster. The receding heat may be as rapid as the rise; nevertheless the finished article will meet the requirements.

Thermostatic Control of Plastic—It is recognized here that thermostatic control of the plastic, not the water bath, is important; but in making dentures with the many variations of acrylic preparations (plasticized and otherwise) on the market, the technician is forced to enter the field of experimenta-

(*Continued on page* 117)

Reinforcement of Acrylic Inlays and Crowns

NEWMAN D. WINKLER, D.D.S., New York City

IT HAS BEEN proved that acrylics are particularly suitable for construction of inlays and crowns where bulk can be applied. There are many contraindications, however, where the preparation does not allow sufficient thickness of the acrylic to withstand the stresses imposed upon it. Such cases require reinforcement. It is necessary, because of the small, thin areas, that thin and strong metallic substances be employed for such reinforcements. Because acrylic in combination with metal is adherent, means must be utilized for overcoming torsional stresses. This can be accomplished by the following rules:

1. Never employ acrylic against polished metallic surfaces (Fig. 1).
2. Avoid embedding metal in a straight line. Torsional stress will usually cause breakage (Fig. 2).
3. Where metals are to be exposed at any portion, use precious metals.
4. For large areas where the bite is close (as on the lingual surfaces of anterior crowns) wire-mesh of a fine gauge is adaptable (Fig. 3).
5. For inlays when the preparation does not allow for sufficient retention, platinum wire may be embedded and exposed in part, to secure this retention (Fig. 4).
6. In pinledge inlays, roughened wire staples of fine gauge are suitable (Fig. 5).

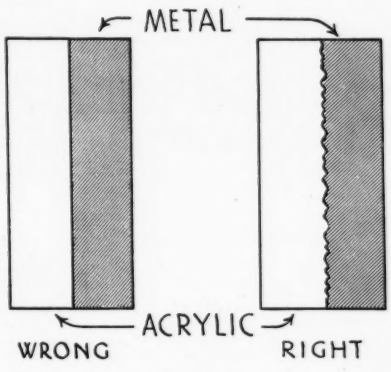


Fig. 1—Never employ acrylic against polished metallic surfaces.

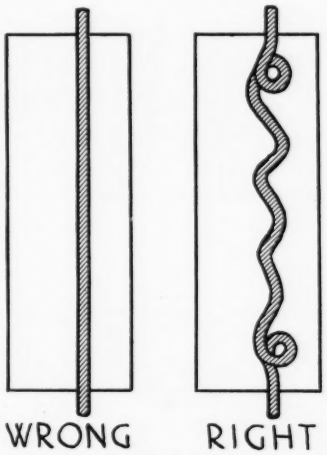


Fig. 2—Do not embed metal in a straight line. Torsional stress will usually cause breakage.

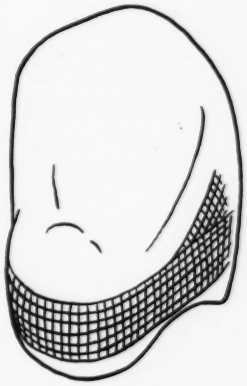


Fig. 3—For large areas where the bite is close (as on the lingual surfaces of anterior crowns) wire-mesh of a fine gauge is particularly adaptable.

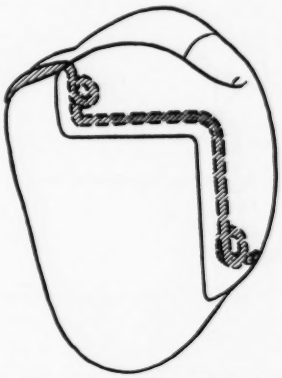


Fig. 4—Platinum wire embedded and exposed in part to secure retention of inlay.

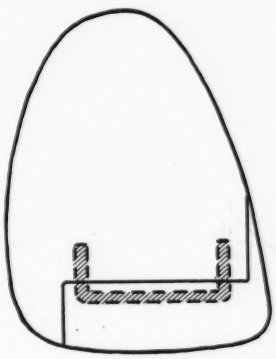


Fig. 5—Pinledge inlay. Roughened wire staples of fine gauge are suitable.

Technique

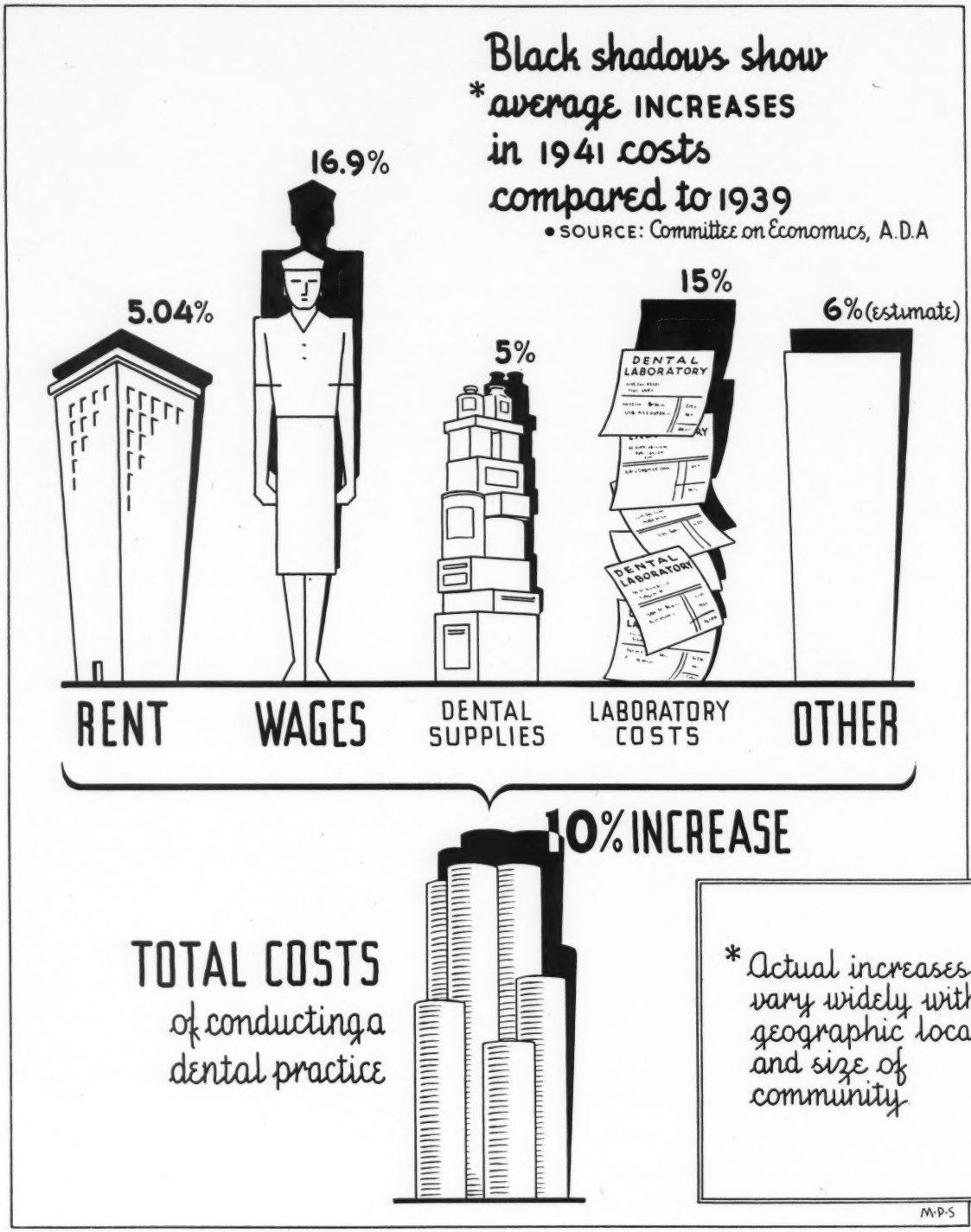
1. After the model has been tin-foiled (or some other separating medium has been used) the metal to be employed is tempered and then roughened by means of stone or serrated pliers.

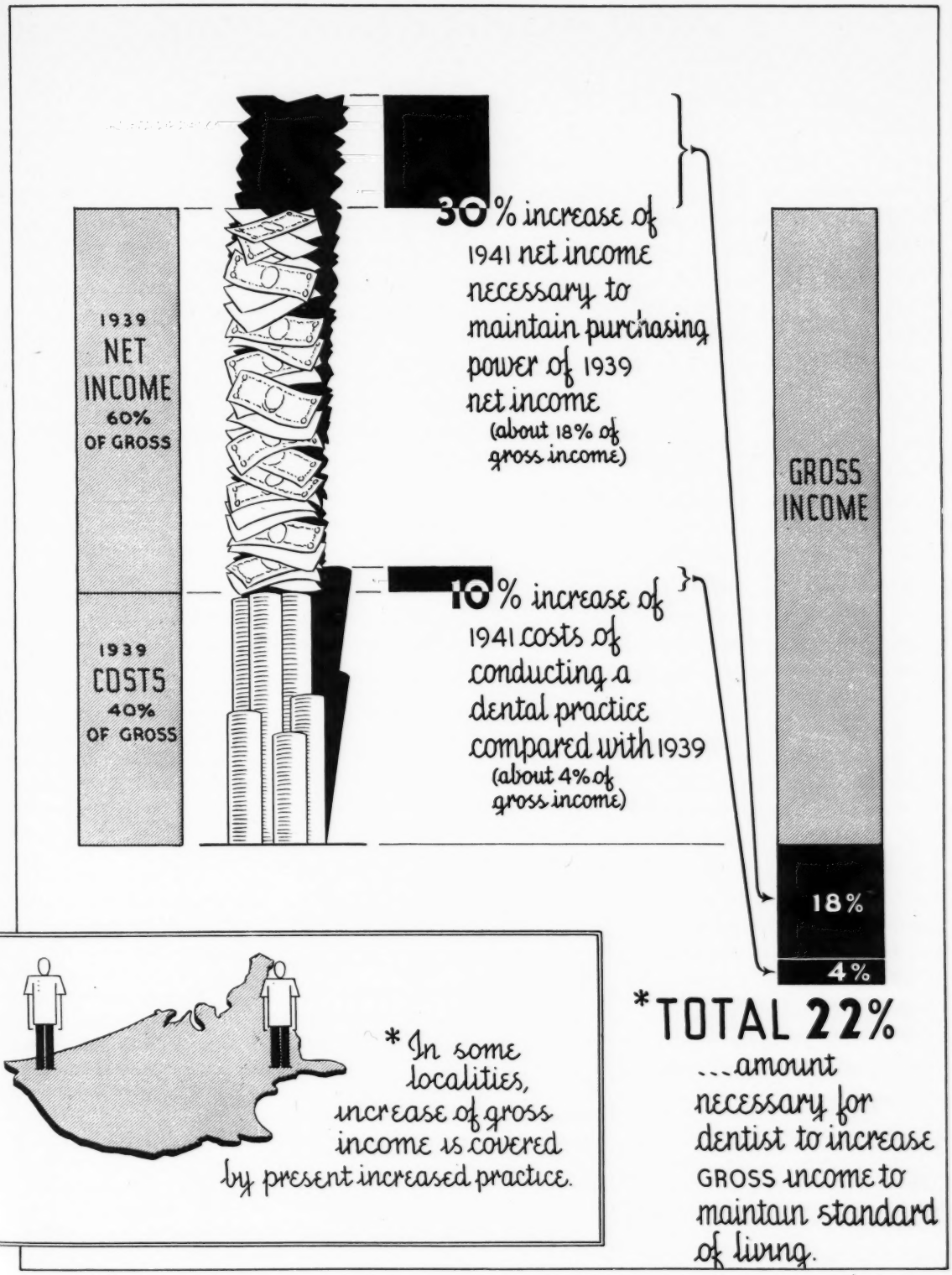
Wire-mesh is used without this procedure. In the use of wire, a fine loop may be used for initial retention, and the remainder follows the contour of the step in the preparation. This is then removed from the model and set aside.

2. Continue the investment of the model in the flask and boil out the wax.
3. Apply a thin layer of acrylic to the floor of the cavity.
4. Insert the prepared metal reinforcement.
5. Complete the packing.
6. The reinforcing wire should be deeply embedded for esthetic effect.

2488 *Grand Concourse.*

Rising Costs of Conducting A Dental Practice




1939
NET
INCOME
60%
OF GROSS
1939
COSTS
40%
OF GROSS
30% increase of 1941 net income necessary to maintain purchasing power of 1939 net income
(about 18% of gross income)
10% increase of 1941 costs of conducting a dental practice compared with 1939
(about 4% of gross income)
GROSS
INCOME
18%
4%
*TOTAL 22%
...amount necessary for dentist to increase GROSS income to maintain standard of living.
* In some localities, increase of gross income is covered by present increased practice.

Direct Acrylic Restorations*

GREGORY B. SALISBURY, D.D.S., Philadelphia

DIGEST

This report is prompted mainly by the many letters received following the January publication in this magazine of my article on the DIRECT APPLICATION OF METHYL METHACRYLATE TO THE TOOTH: CURED AT MOUTH TEMPERATURE. Many were interested in the immediate jacket technique; others, in various additional uses for the product. Dentists inquired about the name of the material used. Correspondence and the questions asked at the recent Greater Philadelphia Annual Meeting indicate that the profession is looking for filling materials that will overcome present shortcomings. Most of the inquiries revealed a meager knowledge of the chemical and physical properties of acrylic resin.

In order to clarify the technique and to eliminate misunderstandings and possible failures, the questions are reproduced and answered in order.

Questions and Answers

Q. *What material do you use in the direct acrylic restoration technique?*

A. Standard methyl methacrylate fine mesh polymer of 100 mesh or finer. It should be tooth-colored. The clear powder of this type should appear under the microscope as clear globules without amber or bluish tints which would indicate "bootleg" varieties. "Bootleg" acrylics are made from reground scrap which is inconstant in performance. Commercial grindings contain plasticizer or oil, covering the individual granules, to keep plastic from clogging the injection molds. This film will prevent proper polymerization of the polymer by the monomer, as reported last month in this magazine. Partly polymerized acrylic restorations, whether of the flask type or the direct type, will distort and fail. What may pass in denture construction will not do in small restorations, because all discrepancies are proportionately magnified. Tooth-colored acrylics produced under the licenses of Du Pont and Rohm & Haas are recommended. I am now working on a formula which will ultimately improve the existing types and make them more suitable for the direct technique.

Q. *How can you cure acrylics at mouth temperature when it requires boiling to cure the acrylics and to complete the polymerization?*

A. Several erroneous thoughts are widely accepted today: Boiling does not complete the polymerization, and it does not complete the curing of methyl methacrylate. Heating does not harden the acrylic. It actually softens it; thus, the word thermoplastic. Polymerized acrylic can be resoftened by heat of 257° F. It begins to melt at 482° and reverses the polymerization at 842° F., converting 90 per cent of polymer back to monomer. Heating a flask up to 160° F. brings the plastic mass to its softest and most plastic state as soon as the mass also attains that temperature. Opening the flask immediately after the case has been boiled will show a soft acrylic restoration. Gradual cooling with the flask closed, however, will produce the desired hardness.

Actually the plasticizing or solvent action is created by monomer itself which attacks the elastic membranes of the polymer spheres, destroys them and coalesces the spheres together, eliminating the interglobular spaces. Under pressure the spheres assume hexagonal shapes as shown here last month in my photomicrographs. Heat acts only as a catalyst.

Those who have seen my clinics have seen me place direct acrylic restorations at room temperature, and produce practical hardness in five minutes and an excellent hardness in twenty-five minutes. Room temperature, and not mouth temperature, was used. To be sure, the ultimate complete polymerization will be slower in a model tooth than in the mouth.

According to the texts polymerization takes place between 168° and 190° F. I disagree with this. Polymerization takes place immediately after the addition of monomer to polymer and goes on regardless of the rise in temperature. Heat merely speeds the process. Heat, as will be shown later, if excessively used, is detrimental.

In direct acrylic restorations, surface hardness is sought, just as in silicate restorations. The final complete polymerization is allowed to go on slowly, after the patient is dismissed. The photomicrographs previously referred to conclusively showed that within twenty-five minutes to half an hour ample polymerization occurred to retain the restoration safely in the mouth. Polymerization of methyl methacrylate is an exothermic reaction, releasing ample heat, which combined with the temperature of the mouth allows ample heat to produce catalystic action.

Q. *How can you obtain enough compression to prevent shrinkage beyond the normal, and how do you eliminate porosity?*

A. Compression is obtained by overfilling the cavity and compressing the mass both at the time of filling and by finger pressure over the excess. This pressure is maintained for five minutes, at the end of which time sufficient hardness results. This will retain the compressed state of the acrylic restoration. Slow polymerization of the bulk will

*Read before the Portland Dental Society, February 10, 1943, Portland, Maine.

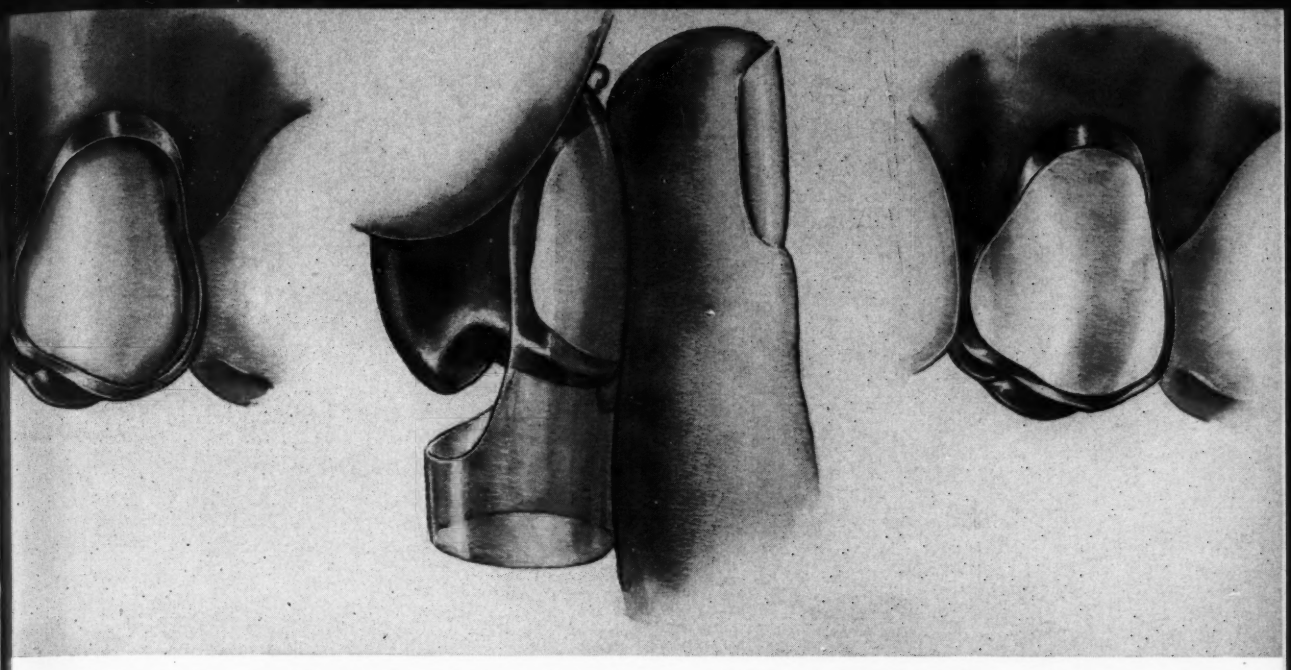


Fig. 1—Direct application of acrylic resin to veneer a gold crown already in position.

prevent the excessive shrinkage of curing that occurs at 158° F. in flask curing.

This shrinkage which is 5.6 in excellent techniques, such as that advocated by La Mar Harris,[1] will be compensated down to .5 by the excess from the trough around the pattern, or by the injection technique as practiced by Pryor.[2] Complete closure of the flask at this temperature will also overcome most of the shrinkage. Most of the other techniques, however, do not properly compensate this loss in volume, so that the results are inaccurate and porous. Direct technique of curing keeps the shrinkage at a minimum.

Rapid heating during the flask-curing volatilizes the unpolymerized monomer, producing porosity, which is not encountered in the slow polymerization at low temperatures. Using a wet sand mix, free of excess monomer, likewise eliminates another cause of porosity, common in flask-curing.

Under-packing, which is sometimes the cause of shrinkage and porosity in acrylic restorations, is eliminated if the direct technique is properly followed. There is likewise no steam given off from the investment at high temperatures, which is always a factor in flask-curing.

When the excess, which is of poorer texture, is trimmed off, the surface reached is smooth and excellent. Coating the excess for half an hour with cocobutter prevents loss of monomer and also prevents the bleaching action of water in saliva on the acrylic. After the restoration is trimmed for occlusion, half an hour later, another bit of cocobutter should be applied.

Q. *What volumetric changes do the direct acrylics undergo? How do they compare with the normally cured acrylics?*

A. A better fit results from the direct acrylics, obviously because there are eliminated the variables of impressions; foil; investment linings; alluvial changes in stone and plaster; high temperatures; improper flask closures, and mutilations of the finished product. Drying out of the restoration is likewise eliminated, because the restoration is finished and remains in the mouth, bathed by saliva.

Porosity and drying out of the product, which are followed by excessive water absorption, and volumetric changes, do not enter into the direct technique.

There is no cement to pull away from, under stress, nor is there a chance for improper seating, with subsequent spring potential. Elastic distortion takes place in direct acrylics as well as in the other, at the point of the impact. Not depending on the cement, however, it does not run the risk of breaking away from the cavity.

After observing the restorations in my mouth over a period of a year, under normal and abnormal stresses, I am convinced that properly placed direct acrylics show no practical distortions, such as sometimes are observed in acrylic inlays. They are sufficiently hard to resist the stresses of mastication.

Q. *What is your technique of mixing?*

A. After saturating the polymer, heap with monomer either in a mixing jar or on a glass slab; mix for one minute. It is immaterial how the spatula is handled so long as the monomer is given a chance to join the polymer intimately. Use room temperature, and do not warm the slab or the jar. Heating either will volatilize off monomer and produce an improperly polymerized restoration.

Q. *Is a cement base essential, especially in shallow cavities?*

A. Cement is essential in this technique. Monomer is an irritant, half way between chloroform and alcohol. It is not so irritating as the silicate liquid, but it must not come in contact with the pulpal wall. Cavity varnishes cannot be used as they react to methyl methacrylate; likewise some mixes will create exothermic heat sufficiently great to produce a thermal shock to the pulp. In

[1]Harris, L. W.: Read before the Greater New York Dental Meeting, December, 1942.
[2]Pryor, W. J.: Injection Molding of Plastics for Dentures, J. A. D. A. 29:1400 (August) 1942.

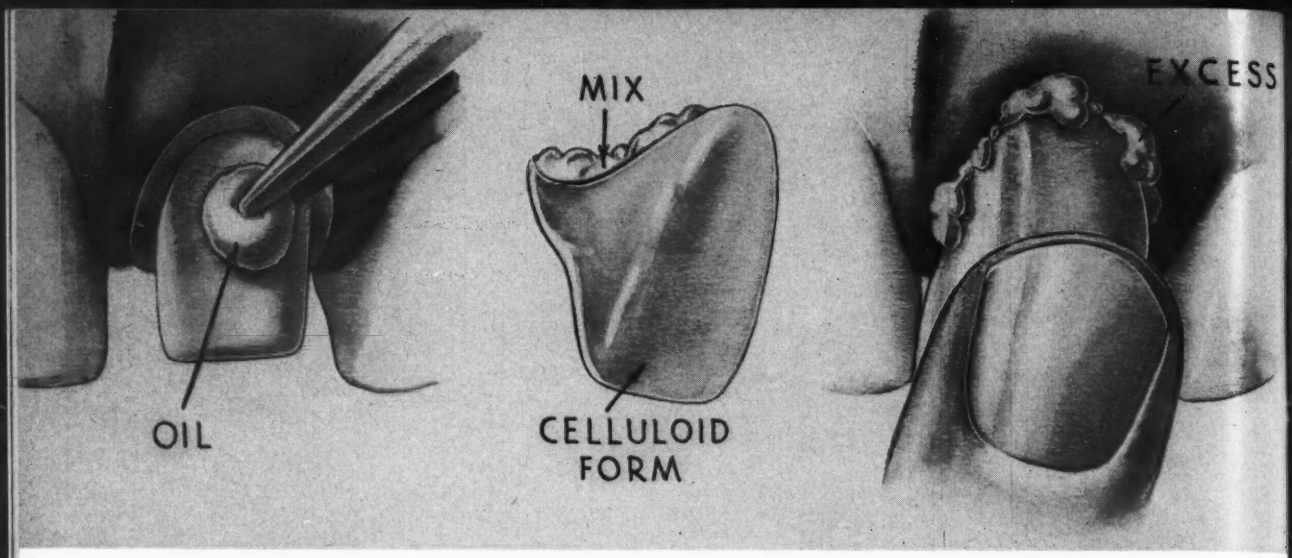


Fig. 2—Technique for a temporary jacket crown.

shallow cavities, flow a thin film of cement with an old number 17 explorer.

Q. *Is it essential to use hot air? I have no hot air connection in my office. Would a heated ball burnisher do the trick?*

A. Recent direct acrylic restorations have hardened sufficiently on the surface within five minutes, and additional heat is unnecessary. It is only when the surface jell is poor that warm air or a warm burnisher will aid in producing the initial stiffness. If a margin curls away from the cavity, burnish it down, and compress the area with the ball burnisher. Recent experience has proved that excessive heat after five minutes only produces porosity by driving off monomer; may melt or soften the hardening acrylic, and generally will produce uneven polymerization.

Q. *What specific polishing agent is recommended for direct acrylics?*

A. Use tripoli on a brush. Keep the area moist. Follow with tin oxide on brushes, and felt wheels.

Q. *What failures have been encountered in occlusal restorations?*

A. Insufficient bulk and inadequate retention caused an original failure. Have a trace of cocobutter on the finger. Methyl methacrylate may stick to the finger and partly pull out of the cavity if the operator hurries the technique.

Q. *Has the copper band any reaction on the soft acrylic mass?*

A. Methyl methacrylate is inert to metals.

Q. *What precautions would you advise in compound cavities, in posterior teeth?*

A. No narrow isthmus at the neck, no shallow occlusal seat should be allowed. The gingival seat should be on an incline apically. Use retention points. The copper band must fit tightly around the tooth, and it must be properly annealed and contoured. A loose band will produce a loose restoration which will pop out. Keep the band on for two days at least—the longer, the better. Prior to filling the cavity make sure that the band does not interfere with occlusion.

Q. *Can the direct method be used to replace a faulty MOD inlay on a bicuspid or molar, where bevel and slice were used?*

A. Direct or the usual acrylic restorations must not be used with slice or bevel preparations. Reshape the cavity into a mortise or a box preparation if methyl methacrylate is to be used.

Q. *Anterior teeth usually have approximal cavities. Do you advise restoring the two at the same time? If so, describe the procedure.*

A. Obtain previous separation. Prepare both cavities. Fill one with guttapercha. Fill the other as described in the January issue. Finish the restoration at the next visit. Fill the other side. Experience has shown that attempting to fill two cavities at the same time, with a new material only results in failure. After many restorations have been inserted by the operator, double ones may be attempted.

Q. *Will a restoration of the incisal angle withstand very much stress?*

A. If excessive stresses are anticipated a pin is recommended as additional support. Use the gauge employed in pinlays. Cement it in the preparation in the shape of a "U." Pack the acrylic around the loop, and restore the incisal angle, as described in the January issue. If the incisal edge is very translucent, warm the pin, and paint an opaque over the pin.

The opaque is prepared in the following fashion: Dissolve clear acrylic in chloroform. Add titanium dioxide on a brush and paint over the warmed metal. Chloroform evaporates off, leaving an opaque lining.

Q. *What additional applications of direct acrylic could you suggest?*

A. Veneering full gold crowns, reveneering broken veneer crowns, temporary jacket crowns, immediate direct jacket crowns, veneering large gold inlays, repair of dentures, replacement of loosened teeth on dentures, certain removable and fixed bridge repairs, restoration of favorable cases of broken facings.

Technique of Veneering the Gold Crown

Sometimes, when it is financially impossible to restore the esthetics, by replacing the offending restoration, or when a bridge is attached to the crown and its removal is contraindicated, a veneer of acrylic may be placed over the labial or the buccal surface:

1. With a knife-edged stone, cut out

a window in gold. Leave enough of the gold rim gingivally to insure strength of the crown.

2. Remove the gold and the cement that is underneath, and trim enough off the tooth to allow for sufficient bulk of acrylic and a cement lining.

3. With a number 34 inverted cone, undercut the entire cavity.

4. The pulpal axial wall should be so prepared as to follow the contour of the tooth. This will insure proper retention and resistance. Do not have shallow proximal walls. Be sure that not only the cavity is undercut but that the rim of gold likewise acts as a retention rim.

5. Flow cement over the pulpal wall. Trim it, conforming to the proper cavity design.

6. Fill with a wet sand textured mix, using one or two shades as desired. Have plenty of excess.

7. Lubricate slightly a celluloid tubular matrix with a trace of cocobutter, and press in the acrylic, using plenty of compression. Allow to set for five minutes.

8. Remove the matrix or form, and trim off the gross overhang incisally or occlusally. Cover the restoration with cocobutter and have the patient wait in the reception room for half an hour.

9. Return to the chair, and trim off any undesirable excess, leaving some excess behind to be finished off and contoured two days later.

Reveneering the Broken Veneer Crown

Porcelain veneers frequently break off when the gold occlusal or the incisal protective rim is chewed through, and if an interchangeable type of facing was not employed, the patient is really handicapped, especially if a bridge is attached to the restoration. Treat the case in the same fashion as for veneering a gold crown. Be sure to allow for ample thickness of the acrylic veneer. Obtain sufficient retention.

Temporary Jacket Crowns

1. Contour a celluloid form to fit over the tooth preparation.

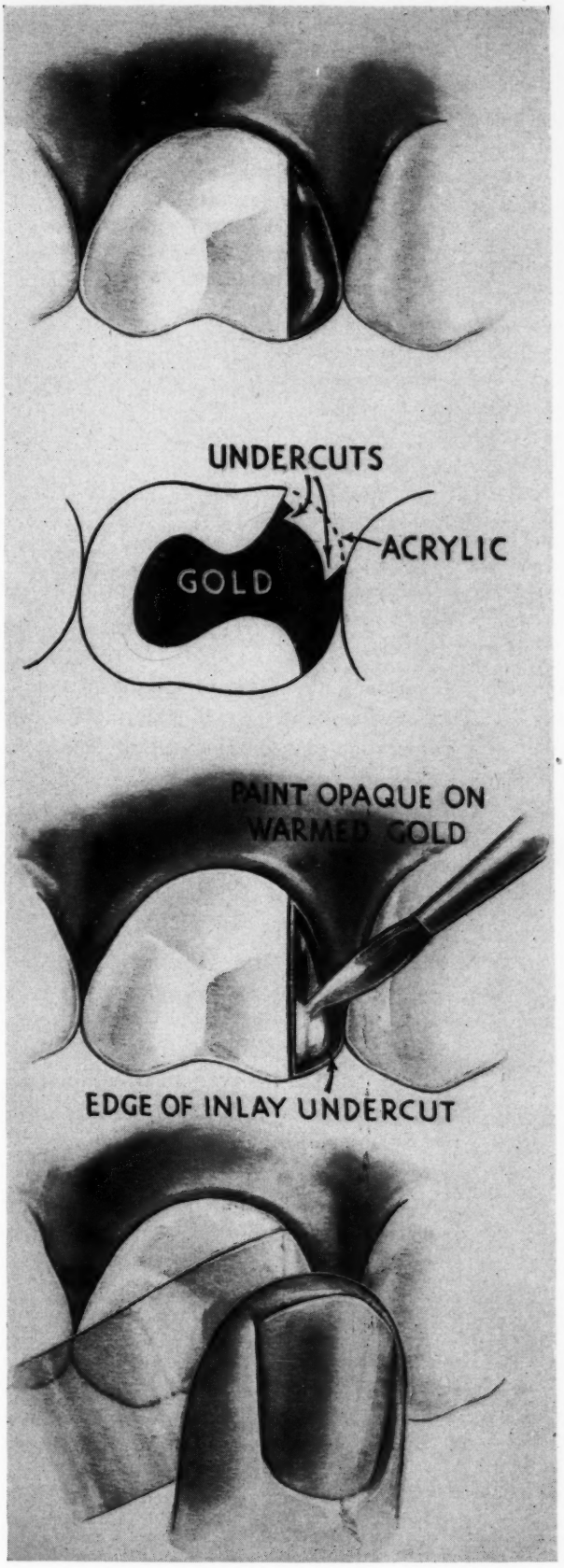


Fig. 3—Technique for cutting a window in a large gold inlay and the placing of a plastic veneer to improve the esthetics.

2. Oil the preparation. Wipe off the excess.

3. Pack the incisal wet sand mix of acrylic and follow by the body mix, so that the celluloid form is filled.

4. Force this over the tooth preparation and hold in proper position until it hardens sufficiently. This takes about five minutes; then remove. Wipe off the oil from both the tooth and the jacket.

5. Mix zinc oxide and eugenol to a stiff mix.

6. Cement the jacket, from which the overhang has been previously trimmed, with the medicated dressing. This jacket will be esthetic, and may be removed and again replaced if the permanent jacket should not prove satisfactory.

Immediate Direct Jacket

Using the technique for the temporary crown for the immediate direct jacket, the jacket, if satisfactory, may be cemented on with regular cement instead of zinc oxide and eugenol. The final cure will be effected in the mouth. Be sure that the occlusion is satisfactory while the acrylic is still soft, so as not to mutilate the celluloid protection over the acrylic.

After cementing the restoration, a warm burnisher is used to soften the acrylic at the gingiva so as to conform exactly against the tooth, removing any trace of the cement from the vulnerable margin.

This technique has been employed in several cases of peg-shaped small laterals which needed little preparation. The esthetic result was beautiful. These cases are under observation and for the time being are considered experimental.

Large Gold Inlays Veneered

A cavity is prepared in a large gold restoration in such a manner as to present a labial or a buccal veneer, without weakening the inlay. It should be a box-shaped preparation presenting four walls, which should be undercut for retention. If the preparation includes tooth structure, the dentine should be coated with a lining of cement. Warm the metal and paint the opaque, previously described. Press in the acrylic mix, and treat as any direct acrylic restoration.

Forty-Ninth and Locust Streets.

We Can't Pay You, But—

No dental author can ever be *paid* for a valuable technical or scientific article. The value of such material is above a monetary basis. In the preparation of a technical article, however, an author often expends money for drawings, photographs, models, typing, and other material services. We would like to help defray some of these expenses.

Beginning February 1, 1943, and until further notice, the author of *every* article accepted for publication in The DENTAL DIGEST will receive $25.00 to offset some of his expenses in preparing material for publication.

Before the year is out about 20,000 of our dental colleagues will be in military service. Few of them will have the time, the facilities, or the opportunities to develop new techniques or to write for the dental literature. They will be eager, however, to read of the new developments in dental science and art.

Writing articles for publication in technical journals can be a contribution to the war effort, because that is how to help our dental officers in the Army and Navy keep abreast of technical advancements, and it is one way to improve the skill and services of civilian dentists on the home front.

If you have a constructive idea, an innovation, a new result of tried and proved experiment, put it down in writing, illustrate it, and send the material to: The Editor of The DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

We hope that you will accept this invitation!

Physiologic Determination of the Vertical Dimension

W. J. KELLY, D.D.S., and H. W. LANGHEINZ, Ph.G., D.D.S., Elizabeth, New Jersey

DIGEST

1. The importance of lost intermaxillary distance and its effects on combat aviators is recognized. It falls entirely within the field of dentistry to determine the extent of the condition and devise means of correction. To that end an instrument is offered to determine correct intermaxillary distances.

2. A procedure is presented for accurately determining loss of vertical dimension physiologically, instead of depending on arbitrary standards, such as facial proportions, patient response, or pain symptoms.

3. Results of bite correction can be checked for accuracy with the same procedure. The results can be further checked and permanently recorded roentgenographically.

WILLHELMY HAS reported[1] that loss of vertical dimension in aviators causes stenosis of the eustachian tube during certain rapid altitude changes. This stenosis frequently results in aerotitis and its attendant vertigo and loss of coordination with serious and possibly fatal results.

A device is presented (Fig. 1) to determine correct intermaxillary distance by measuring the relative force of muscle power at various intermaxillary distances.

There is a critical length of distance between origin and insertion at which muscles can exert their greatest force in contraction and give their most prompt response. This critical dimension maintains a state of elastic tension in the muscles which is their physiologically normal state; therefore, when the muscles are in normal tone, the bones to which they are attached are in their normal relation to each other.

Preparatory Steps

1. The device presented is an electronic control operated by pressure on a reactance disc placed between the teeth of the opposing jaws.
2. Impression compound is applied to the flat surface of the disc and the lower teeth are gently closed into it.
3. The compound is then chilled.
4. A similar procedure is followed for the opposing teeth, except that the compound is placed on a small metal

[1]Presented before the Institute of War Medicine and Surgery for Dentists, Chicago, October 29, 1942.

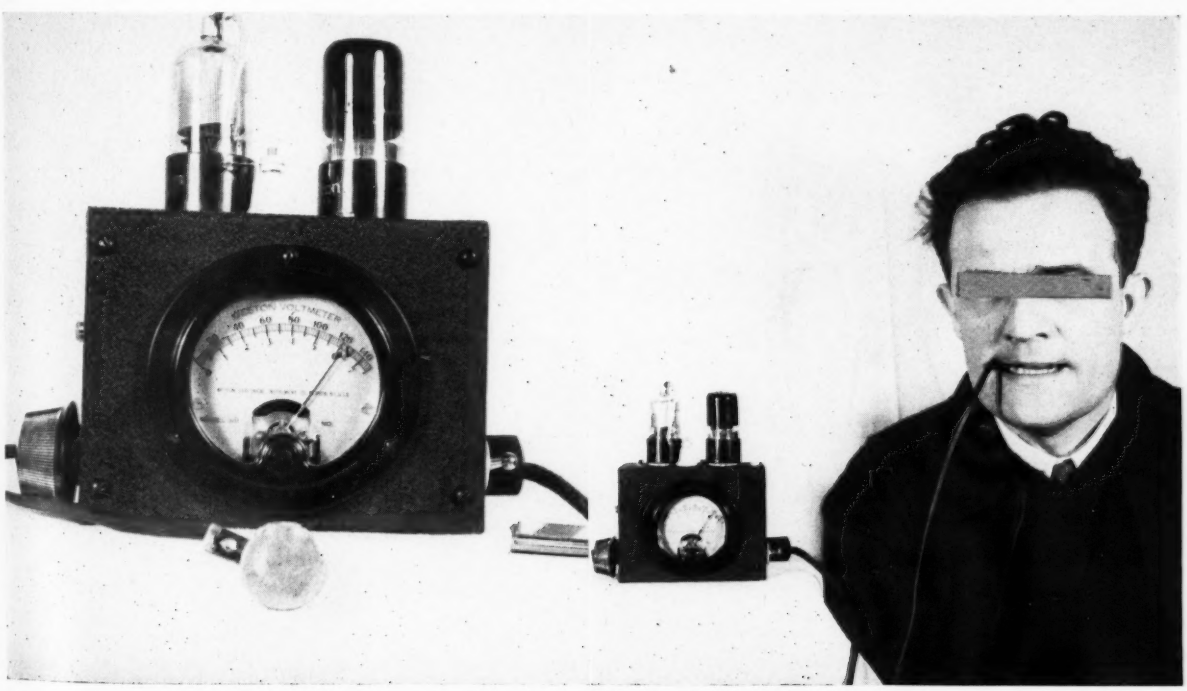


Fig. 1—Vertigraph, with biting disc, metal shims to increase vertical dimension and scale of meter set to arbitrary reading of 123.

Fig. 2—Patient biting on the disc alone (2 mm. for free-way space); reading stays near arbitrary base setting. Poor biting pressure.

Fig. 3—Metal shim inserted to open bite 2 mm. more; meter swing showing increase of biting force at this distance.

Fig. 4—Additional shims inserted to open bite 4 mm., and meter falls off showing loss of biting force.

shim. This compound supports the teeth during the bite tests and prevents injury to cusps or weak teeth.

Procedure

1. The electronic device has a sensitivity control knob at one end, so that the sensitivity of recordings can be increased for delicate bites or decreased for heavy, massive jaws. By means of this knob an arbitrary zero or starting point is established on the meter.

2. The patient is then requested to exert maximum biting pressure on the disc and shim, and the amount of deviation of the meter indicator is noted.

3. A metal shim is interposed between the disc and shim in the mouth

Fig. 5—Patient biting on disc alone (left side); shows slight change on the meter.

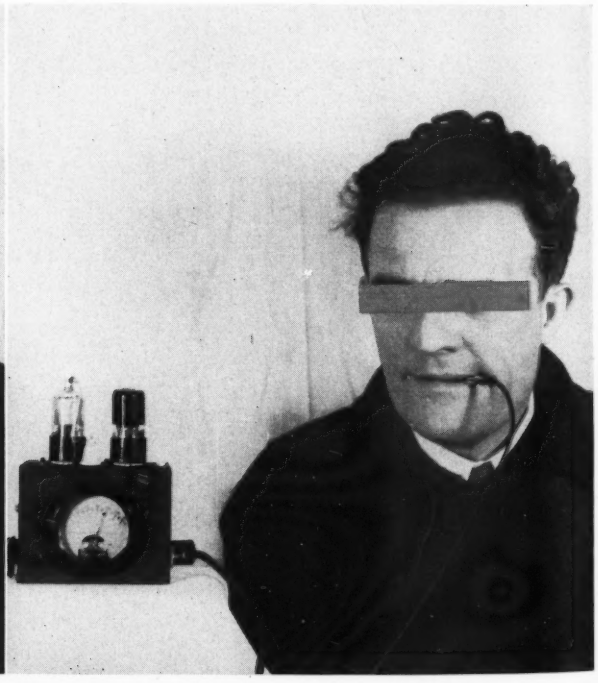


Fig. 6—Shim inserted to open bite 2 mm.; slightly greater change in the meter.

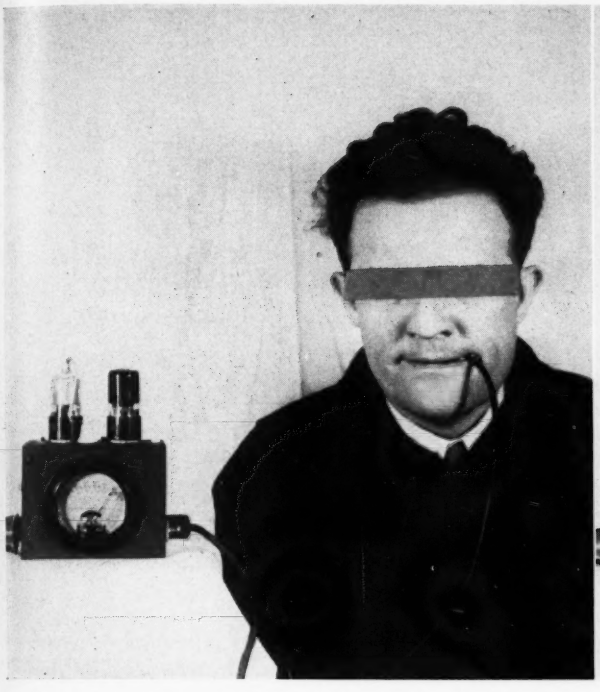


Fig. 7—Bite open 4 mm. and immediate increase in biting force is registered on the meter.

Fig. 8—Bite is now opened 6 mm. and the meter falls, showing decrease in biting force. Maximum biting force obtained on the left side with an opening of 4 mm.

and the pressure deviation is again recorded.

4. This procedure is repeated until the point of maximum meter fluctuation has been passed.

5. The shims are then removed from the mouth until maximum fluctuation has been reestablished (Figs. 2 to 8).

6. The thickness of the disc and superimposed shims necessary to create this maximum registration is measured. This is the amount of vertical dimension increase necessary to reestablish normalcy, minus from 2 mm. to 4 mm. for free-way space. A ponderous bite will require more free-way space than a more delicate bite.

7. The procedure outlined is followed on both sides of the mouth as there may be a deviation in loss of vertical dimension on the two sides of the same mouth. Similarly there may be anterior or posterior loss, indicating that a check-up should be made in several regions: molars, bicuspids, and anteriors.

Comments

In the event that a maximum reading is obtained on first trial, without placement of additional shims, a normal bite or open bite is indicated. Open bite would be readily distinguished on stereoscopic roentgenographic examination of the temporomandibular articulation. Such stereoscopic roentgenograms should be taken in every case before and after bite reconstruction so as to check results and prevent traumatization of the structures in and adjacent to the glenoid fossa.

563 *Newark Avenue.*

Rapid Polymerization in Denture Construction

(*Continued from page* 106)

tion regardless of any so-called temperature control gauge.

Lamination—Last year before the Chicago Dental Society I gave a clinical demonstration of laminated denture construction. It is doubtful whether any of the men in those classes tried more than once to make dentures by the method presented, because the time and labor involved hardly seemed worth the more accurate adaptation to the cast and mouth. Today I still advocate lamination, but by a procedure that enables the technician to process the denture in one hour, with assurance that the finished case will fit the cast and retain its close relationship far better than any popular method of my knowledge.

The technique for rapid polymerization, using a staggered heat control and a laminated processing method, will be presented in this magazine next month.

55 *East Washington Street.*

Oral Manifestations of Occupational Origin*

Etiologic agent of occupational origin + *Poor oral health* = *Oral occupational disease*

**Adapted from Schour, Isaac; and Sarnat, Bernard G.: Oral Manifestations of Occupational Origin, J. A. M. A. 120:1197 (December 12), 1942.*

OCCUPATION	ACTIVE ETIOLOGIC FACTOR	POSSIBLE ORAL MANIFESTATIONS
Cobblers, carpenters, glass blowers, musicians (wind instruments) seamstresses	Instruments, tools	Localized abrasion of hard dental tissues
Garment workers	Dyes, foreign bodies in mouth	Stomatitis, abrasion of teeth
Fishermen, asphalt and coal tar workers, pavers, pitch roofers, wood preservers	Tar	Stomatitis, carcinoma of lip and mucosa
Bronzers, cement workers, electrotypers, grinders (metal), miners, stone cutters	Copper, iron, nickel, chromium coal, dust	Staining of teeth, pigmentation of gingivae, generalized abrasion, calculus, gingivostomatitis, hemorrhage
Bone, celluloid, flour, sawmill, textile and tobacco workers	Bone, celluloid, sawdust, flour, tobacco	Staining of teeth, pigmentation of gingivae, generalized abrasion, calculus, gingivostomatitis, hemorrhage
Arsenic roasters and handlers; chemical workers, electroplaters, metal refiners, rubber mixers, lead smelters, insecticide makers	Arsenic	Osteomyelitis and necrosis of mandible; necrosis of bone
Bismuth handlers, dusting powder makers	Bismuth	Blue pigmentation of gingivae, oral mucosa, gingivostomatitis
Aniline compound, chrome, photographic and steel workers, blue printers and rubber mixers	Chromium	Necrosis of bone, ulceration of oral tissues
Cryolite workers	Fluorine	Osteosclerosis
Electrotypers, insecticide and storage battery makers, lead refiners, printers, rubber compounders	Lead	Blue-black pigmentation of gingivae, gingivostomatitis
Bronzers, battery and paint makers, *dentists*, detonators explosive and mercury salts workers	Mercury	Gingivostomatitis, osteomyelitis, ptyalism

Brass founders, match factory, phosphor bronze workers, fertilizer and fireworks makers	Phosphorus (white, yellow)	Gingivostomatitis, ulceration of oral tissues, osteomyelitis
Polishers and blasters	Dust	Abrasion, pigmentation
Refiners, bakers; candy makers	Flour, sugar; sugar	Caries
Tasters	Hot food (coffee, tea, soup); wine and liquor	Stomatitis, leukoplakia; anesthesia and paresthesia of tongue
Aniline, coal tar, explosive workers, painters, tannery workers, vulcanizers	Aniline	Blue coloration of lips and gingivae
Coke oven and lacquer workers, dry cleaners, vulcanizers, smokeless powder makers	Benzene	Hemorrhage from gingivae, stomatitis, blue coloration of lips
Coal tar, rubber, tar, distiller and surgical dressing workers; disinfectant makers	Cresol	Stomatitis
Divers, caisson workers	Increased atmospheric pressure	Bleeding from gingivae
Aviators	Decreased atmospheric pressure	Bleeding from gingivae
Acid and cartridge dippers, petroleum refiners, explosive and gun cotton workers, galvanizers	Acids, fumes	Bleeding, stomatitis, decalcification of enamel and dentine
Alcohol, distillery, explosive, shellac, smokeless powder and shoe factory workers	Amyl acetate	Stomatitis
Bone grinders, lard, soap, linoleum makers, varnish boilers	Acrolein	Stomatitis
Acetylene, dye, photographic film, phosgene makers, sugar refiners, refrigerating plant, disinfectant, laundry workers	Sulphur dioxide, ammonia, chlorine, bromine	Stomatitis
Miners, smelters, gasoline motor workers	Carbon monoxide, carbon dioxide	Coloration of lips (cherry red, blue)
Technicians, watch dial painters, researchers	Radium, roentgen ray	Gingivitis, periodontitis, osteomyelitis and necrosis, xerostomia, osteosclerosis
Sailors, fishermen	Actinic	Carcinoma of lip

The Editor's Page

AMONG THE VARIOUS methods of pain control, hypnotism is one not frequently mentioned in the professional literature. It is a method greatly misunderstood and sometimes feared, although it is a procedure with its roots in antiquity and is accepted in the modern world in selected cases by the most conservative of psychiatrists. The literature on the subject appears in some of the most respectable journals and carries names of men eminent in medicine and psychology—men who have good training and are respected within their professional societies. It is true that quacks and fakers have practiced hypnotism; so, too, have they practiced dentistry and medicine. It is likewise true that the essential nature of hypnotism is shrouded in mystery; so, for that matter, is the nature of drug action, cellular behavior, and tissue response. Present theories consider hypnotism as a complex entity, part physiologic and part psychologic, and a large part unknown.

According to Erickson,[1] who has written extensively on the subject, the phenomena of hypnotism include: (1) cooperation; (2) suggestibility; (3) catalepsy; (4) post-hypnotic suggestion; (5) amnesia.

Without full cooperation between the subject and hypnotist there can be no hypnotism. People cannot be hypnotized against their will or made to do anything without their knowledge and consent. It is important to emphasize this to correct the issue and to point out that hypnosis is not some form of black magic or diabolic influence. It is a technique of convincing and persuasive suggestion.

Hypnosis is effective because suggestions made by the hypnotist are acted on with conviction by the subject and the subject behaves according to the directions given him. When he is told that he has no pain, he has no pain. It is important to understand, however, that the subject will do nothing that is anti-social or objectionable to him while in the hypnotic state.

Catalepsy is another phenomenon. In this state the subject's arm, for example, may be lifted and will remain fixed in any position without the experience of a sense of fatigue.

While in the hypnotic trance the subject may be given an act to perform at a future time. This is a post-hypnotic suggestion. According to Erickson, "in this phenomenon lies the greatest therapeutic advantage of hypnosis since thereby the subject can be given suggestions to guide his later conduct."

Amnesia as an aspect of hypnosis exists in either a partial or complete state and gives the subject the ability of forgetfulness of all events and experiences that occur during the hypnotic state.

In the literature of hypnotism the word *rapport* appears repeatedly. This is a state of dependence between subject and operator, and according to the depth and completeness of the *rapport* is hypnotism successful. All the writers on the subject insist that there are no dangers involved in hypnotism; that there are no dangers of remaining in the hypnotic state or of any permanent physical or psychologic injury.

The application in clinical medicine includes the use of hypnosis in obstetrics and in psychiatry. The recent dental literature contains few if any references to hypnotism, although writers on the general subject usually include citations of its application to dentistry.

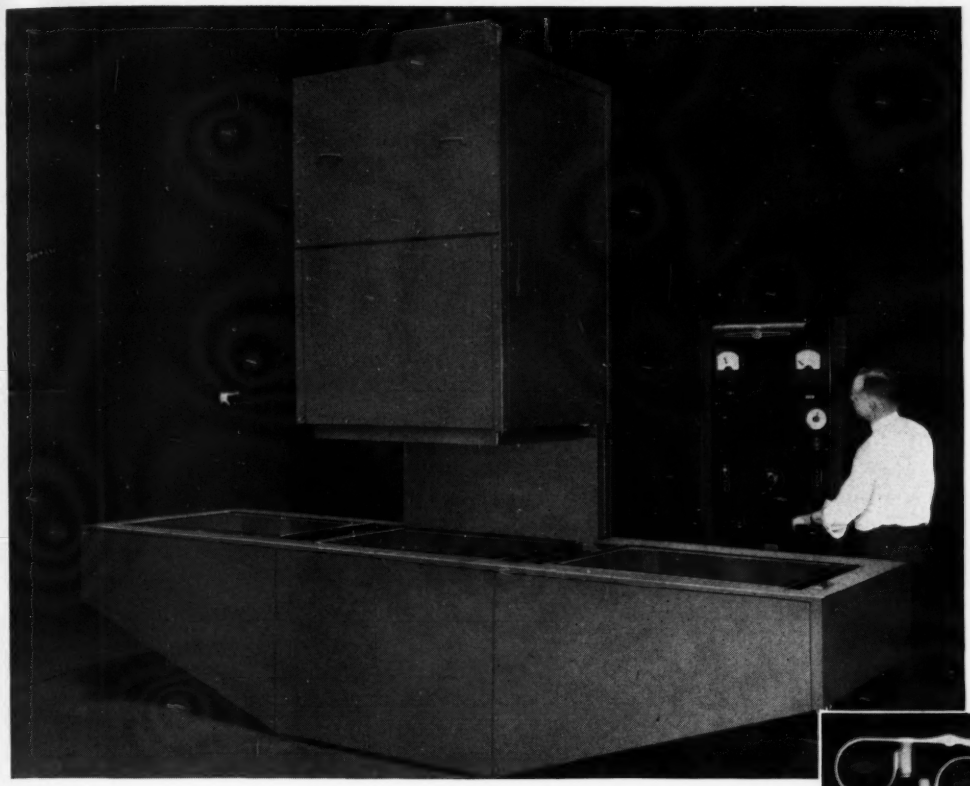
Dentists in common with other persons in society have a fear that there is something sinister involved in hypnotism. They do not recognize that any of the methods used to produce confidence, to allay fear, to foster cooperation are minor forms of hypnosis. The dentist should be freed of the misconception that hypnosis is induced by incantations, mumblings, and hocus-pocus. There is no one form of inducing hypnotism, but actually there are more than one hundred different methods, all of which are based on the principle of putting the patient in a receptive frame of mind and making him physically comfortable so that he will accept the suggestions of the operator.

Dentists are certainly not being advised to become known in their communities as hypnotists, nor is this method to be recommended in lieu of anesthesia, analgesia, or sedation. It is being discussed here solely as a statement of a form of therapy that is said by reputable writers to have a place in practice. The dentist should at least be familiar with the idea of hypnotism as a form of therapy.

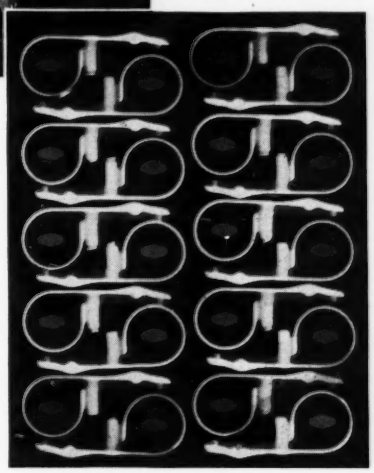
The medical literature of the present[2] and of the future does and will carry many references to the psychosomatic approach to disease. The dentist should be acquainted with this tendency to consider the patient in terms of a whole being and as a total organism —part mind, part body, but largely, as Carrel says, "man, the unknown."

[1]Erickson, M. H.: A Brief Survey of Hypnotism, Medical Record, December 5, 1934.

[2]Editorial, American Society for Research in Psychosomatic Problems, J.A.M.A. 121: 517 (February 13) 1943.



Below: radiograph of tray of small castings



HOW X-RAYS HAVE HELPED *Speed Up* THE WAR EFFORT

As the United Nations answer the arrogant challenge of their enemies with the world's best fighting men, industry works at top speed to keep our forces supplied with the world's best equipment.

Important in making better things faster are the hypercritical inspection methods which insure a steady flow of high quality products. When peacetime inspection methods were found to be inadequate in wartime, G.E. engineers developed the Automatic X-Ray Unit which provides x-ray inspection of small castings with assembly line speed and technique. Trays of small castings pass under an x-ray unit, are x-rayed, and move on. Thus x-ray inspection time is keyed to rapid production time, with no sacrifice in efficiency of the critical x-ray eye.

As a dentist you will quickly see how the rapid advancement of x-ray technology in any field will benefit you in your own field. Just as industry's manpower has benefited from dental radiography with the world famous G-E Model CDX dental x-ray unit in the hands of progressive dentists, so dental radiology will benefit from this wartime progress of industrial radiography.

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Within These Walls . . .

A dentist's life is lived in the confines of a small space. The world comes to his door for services. As a result he may develop certain warped points of view. He loses his critical faculty about his own efforts, because he has no way by which to compare his skills with those of his colleagues, who, in turn, likewise operate alone in their own little spaces. In general the dental restorations that we see in the mouths of patients represent the poorest of our colleagues' efforts. The best results are usually in the mouths of patients who remain with their dentists and do not circulate. The exceptions are, of course: the patients who leave dentists for geographic reasons and because of death; or, in some instances, because of personality clashes or misunderstandings apart from the dentist's skill.

Another danger in the confining nature of dental practice is that the dentist may develop "the little king" complex. People come to him in fear and are not disposed to argue. The dentist expresses opinions on dental subjects, about which the patient has no information. He goes from this oracular plane to another one from which he pontificates about all affairs of the universe. The patient, even if he disbelieves, is inclined to agree. You don't needlessly annoy the man who is going to be using sharp instruments on you. You are rather inclined to placate him and cater to his eccentricities.

Willard Fleming[1] has recently written an article in which he says that dentists, unlike physicians and lawyers who must practice in a larger world than that of the dentist's world—the world of the hospital, the clinic, the courtroom—are not subject to the evaluation of their colleagues. As Dean Flem-

[1]Fleming, W. C.: Won't You Walk a Little Faster? J. Am. College D. 9:404 (December) 1942.

ing expresses it: "Dentists as a group carry on their work within the walls of their offices. Their practices are not open to the examination and criticism of their colleagues, nor do they have the opportunity to observe the changes in dental practice. Hence only the most self-critical and ambitious continue the time consuming and expensive process of education. The physician, working in the clinic and hospital, is open to observation by other physicians. He operates in the presence of anesthetists, nurses and other physicians. His failure to keep in the front rank of his profession becomes apparent to those who are qualified to judge him. The lawyer is in open competition with other lawyers in our courts of law, and his failure to keep abreast of the times is readily apparent. The desire to have others think well of us is a strong driving force. Praise for performance well done is sought by all. The circumstances under which dentistry is practiced are such that it is not subject either to the criticism or praise of other dentists." Doctor Fleming arrives at this conclusion by the examination of statistical evidence—evidence that indicates that the dentist spends less of his income for professional improvement than does the physician. A survey made by the federal government in collaboration with the California State Medical Association, entitled "California Medical-Economic Survey," analyzed the economic lives of 825 physicians and 537 dentists. The result indicated that as the income of physicians increases, physicians spend more for professional improvement; whereas, as the income of dentists increases, they spend proportionately less for improvement, although more for savings.

It is proper that dentists should show a higher percentage of savings during their productive years, because their span of productivity is presumably shorter than that of physicians. There is no fault to be found on that score. The criticism sometimes directed against dentists that they are not learned men but businessmen does seem to be somewhat justified. Dentists do not as a whole spend enough time or money on improving themselves professionally or culturally. Examination of the

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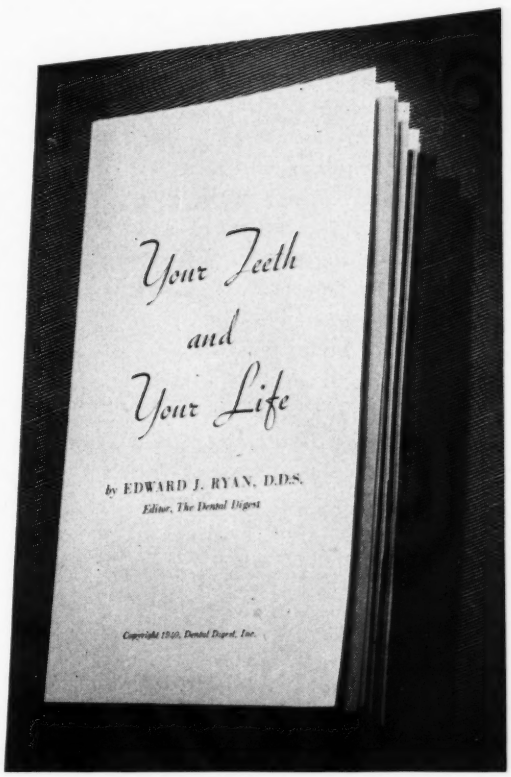

conversation and the attitudes of some of our colleagues points out unfortunately that the statistical study is true. The dentists with the large practices are so engrossed in making money that they boast that they do not have the time to attend dental meetings or read the dental literature, or for that matter, to do anything that does not promote their business. This is a serious indictment of a profession that aspires to a place among the learned professions of the world.

Another indictment sometimes made but not documented in the California study concerns the attitude of dentists toward free services. Free services are not those given to patients for which payment was expected but was not forthcoming. Free services are those that are given as such in advance of treatment. Dentists do not spend much time in schools, in clinics, in hospital outpatient departments, or in caring for the needy in their private practices. Dentists have been known to look upon working in a clinic as a degrading experience and one beneath their social

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dignity. Dental societies that have attempted within their communities to set up some sort of mechanism whereby the worthy charity cases might be handled have found too often that the dentists with the largest practices were least inclined to take on any of these charity cases. The converse should be true. The lucky men with large incomes and big practices should express their appreciation to their lucky stars by caring for some of these charity cases.

These words may sound like those of a common scold. They are blunt, hard-hitting words, and will annoy the sensitivities of some dentists. The shortcomings of dentistry must, however, be pointed out by those of us within the group—far better to do it from within than to have the critics from without expose us to the world with all our shortcomings.

Welcome to the New Journal . . .

Another magazine has been added to the list of dental periodicals. The *Journal of Oral Surgery*, published by the American Dental Association, began its life, which we hope will be long and successful, with the January, 1943 number. This is an auspicious time for such a journal to make its appearance, because the war will give rise to many oral surgery problems. Those of us in the field of dental journalism send sincere good wishes for this new publication which should certainly be in the library of every progressive dentist.

They Won't Be Home for a Long Time . . .

Many of our colleagues going off to the wars will not return for a long while. Even after our enemies are defeated and surrender unconditionally, the long road of reconstruction will be ahead. The peoples of the world who are destitute under the heels of the oppressors will have to have their health cared for just as they will have to be fed and clothed and housed. There is no question that there has been a blackout of professional education in Europe since the war began. There are no figures available from the occupied countries but the presumption is justified that no dentists, or very few, are being turned out by the schools in Europe. We are

also justified in believing that thousands of dentists and physicians very likely will be killed. That means a terrific backlog of dental disease to be treated everywhere, and we seem to be the only people in the world with any manpower and with any facilities to do this job. We can be pretty sure that the peoples of Europe and China, living under starvation for so many years, will have deplorable dental conditions with deficiency diseases rampant.

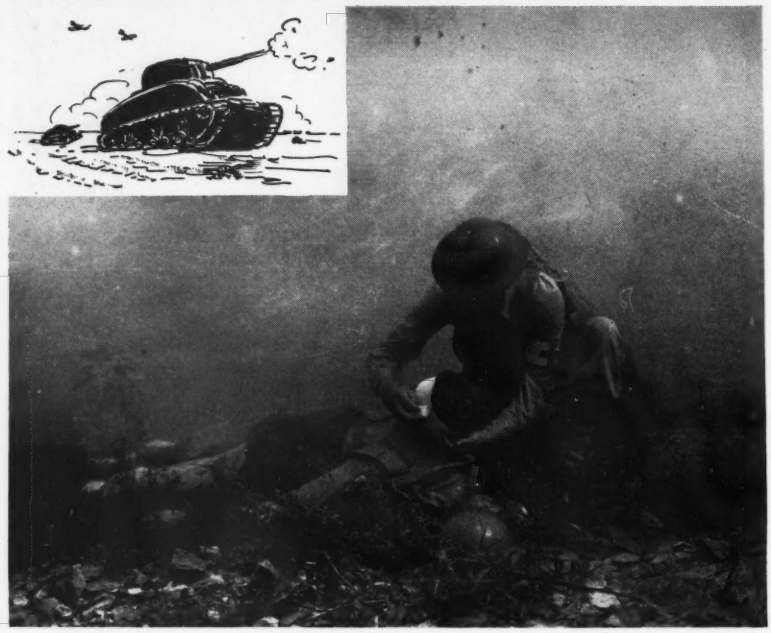
We are reasonably sure that the military forces of the United Nations will be required to act as police forces throughout the world for years to come. We can furthermore be sure that the Medical Department of the U. S. Army will be required to treat thousands of the starving, homeless, and sick. Many of our colleagues now in the Service will be part of this effort at rehabilitation. Many of our friends now going into the Service who think they will be gone for the duration of the war and six months thereafter should be prepared for this long era of reconstruction and plan to stay away from home for a long time. Ideally a whole new crop of medical aides should be sent across for the rehabilitation period and the veterans allowed to return home. But will we have enough new physicians, dentists, nurses to do this?

Death of a Dentist . . .

An item in a Pennsylvania paper describes the death of a dentist in these words: "An abscessed tooth, a condition which he had successfully treated for hundreds of patients, caused the death of Doctor ————. Doctor ————had suffered for some time with an impacted tooth, but because of the pressure of his practice, including treatment for many men called to the army, he postponed attention to it. He continued his work until early last week when a severe abscess developed. After entering the hospital it was found the infection had spread to the blood stream. Serum was used but he failed to respond and declined rapidly in the last two days."

Medical history carries the records of many physicians who died from the disease to which they devoted their lives in research or specialized practice. It is an ironic twirl of fate that a dentist

In your ORAL HYGIENE this month



Dentists Go With the Troops

This is the lead article in the March issue of ORAL HYGIENE. It was written by Lieutenant J. D. Brazeau, a dental officer now in active service. His description, telling that dentists must be ready to give emergency medical service to the troops at any time during battle is a vivid one. "And brush up on your first aid," he says.

A few months ago we published an article telling how dentists have been swindled at some time or other by racketeers. The author wrote us that he had received letters from many dentists throughout the country who had been swindled as he had. In this issue, "Dentists are Targets of Old Rackets" is a frank expose of methods now being used by swindlers who are reviving old rackets to victimize busy dentists. Read it—and be on guard for any swindler who might approach you.

"A Dental Forecast—Year 2143" written by a frequent contributor, Doctor Stanley C. Brown, is an interesting prediction of things to come in dentistry. War does bring changes and we must be prepared.

Then there's the second and concluding installment of "Advice to the Yankee Soldier." The dentist-explorer author warns dentists going on duty in the tropics to beware of strange diseases, insects, and reptiles.

ORAL HYGIENE's popular departments include "Dear Oral Hygiene," "Dentists in the News," "Military News," "Technique of the Month," "Ask Oral Hygiene," "What is Your Diagnosis," and "Laffodontia." And don't miss the editor's "The Stay-At-Homes Are Doing Well." It's frank and to the point.

In your MARCH

Oral Hygiene

should die from a dental infection. It does suggest that most of us are too indifferent to our own dental tissues. Few of us are as precise and regular in our dental appointments as we expect our patients to be.

Critique . . .

In a recent publication, "An Evaluation of Dental Health Literature," two authors[2] have reported the results of their studies of the outpourings of pamphlets, leaflets, and other dental health material issued by state and federal health agencies as well as by the American Dental Association. What they have found is not altogether pleasant. The dental health literature is full of inaccuracies, of misstatements of fact, and contradictions. The authors, Vern D. Irwin and Netta W. Wilson, find that dental health literature suffers from six major weaknesses: (1) Contradictory statements by different writers; in some cases, by the same writers; (2) misleading statements; that is, statements so presented that they may be either true or false according to the way the reader interprets them; (3) impracticable advice; (4) information presented in technical terms with which the laymen is probably unfamiliar; (5) substandard English; (6) inconsistencies in spelling.

We earnestly hope that this work done by Irwin and Wilson is not a thankless job and that from such an intensive critical study, improvement may come in the presentation of dental health literature. It is a safe prediction that the future will see many more efforts directed toward dental health education. The job is too important to be done poorly or immaturely.—E.J.R.

ZINC OXIDE AND EUGENOL AS A TEMPORARY FILLING

By Solomon S. Seidenburg

Brooklyn

GUTTA-PERCHA PLACED in excavated cavities causes a hypersensitivity of the dentine. The threshold of stimulation is lowered, allowing entrance of more stimuli, resulting in the transmission of additional stimulation, and, thereby,

[2]Irwin, V. D. and Wilson, N. W.: An Evaluation of Dental Health Literature, Saint Paul and Minneapolis, Bruce Publishing Company, 1942.

increasing the hydrostatic pressure in the dentinal tubules. This pressure is transmitted to the odontoblasts in the pulp, around which are entwined delicate nerve fibrils. The sensation of pain is then carried to the higher centers and registered there.

The presence of eugenol in the paste is responsible for the sedative and analgesic effect. This material is especially indicated for sensitive class V cavities.

The use of this zinc oxide and eugenol mixture reduces sensitivity of large excavations and of sensitive cervical cavities. It speeds up the operative procedure by allowing the dentist to operate without hindrance.

Method

Zinc oxide, mixed to a paste with eugenol, can be used effectively as a soothing and sedative material as well as a temporary filling.

1. The zinc oxide is mixed on a slab with a few drops of eugenol (depending on the amount required) until a thick mix is obtained, the consistency of which is like plastolene.

2. The mix is then gathered up and rolled into a ball and placed on a piece of gauze or blotting pad to absorb excess of liquid. This gives a putty-like consistency to the mass.

3. The paste is inserted into the sterilized cavity and burnished over the margins with a cotton pellet held in a pair of college pliers.

4. In MOD cavities, a copper band matrix may be employed to facilitate placement of the paste.

5. The occlusion is adjusted, and the patient dismissed.

The zinc oxide and eugenol mixture has a slow-setting time and is simple to manipulate. It sets under moisture in the mouth and becomes hard within one hour. This material, however, lacks adequate edge and crushing strength. Its specific properties are not known, but it is believed that liquid and solid combine in a physical reaction to form an amorphous solid.

Although the mixed paste sets to form a hard mass, it can easily be removed by employment of the spoon excavators or a number 23 explorer hooking into a margin.

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